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BENEFITS OF ICT IN EDUCATION

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Abstract

In both schools and homes, information and communication technologies (ICT) are widely seen as enhancing learning, this hope fuelling their rapid diffusion and adoption throughout developing societies. But they are not yet so embedded in the social practices of everyday life as to be taken for granted, with schools proving slower to change their lesson plans than they were to fit computers in the classroom.

Keywords: *ICT, Educational policy, Educational benefits, learning activities*

Challenges of ICT enabled Education at school and home

The difficulty in establishing traditional benefits, and the uncertainty over pursuing alternative benefits, raises fundamental questions over whether society really desires a transformed, technologically-mediated relation between teacher and learner.

There is little doubt that society's main ambition for children's use of the digital technologies centers on its potential benefits for education. Information and communication technologies (ICT) converge traditionally separated educational technologies – books, writing, telephone, television, photography, databases, games, and more. In consequence, they bridge forms of knowledge and literacy, and they intersect places of learning - home, school, work and community. But these changes pose both opportunities and challenges to schools, for to embed ICT in the educational infrastructure, teacher training, curriculum structures and materials, classroom practices and modes of assessment must be redesigned at all levels

In Britain (Becta, 2009a, b), Europe (Korte&Husing, 2006), the USA (Office of Educational Technology, 2004) and elsewhere, recent years have seen a steady embedding of digital and networked technologies in the classroom, with widespread use of interactive whiteboards, virtual learning environments, educational computer games, and increasing reliance on internet application including email and e-learning for both classroom and independent study

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(Sheard and Ahmed, 2007). A pan-European 2006 survey of teachers of children in the fourth year of primary education, Eurydice (2009, p. 207) observes that,

In comparison with the situation in 2001 … the use of new technologies to teach readingat school has increased… This increase is expected to speed up in subsequent years, with the growth of specialized software and on-line materials intended specifically for teaching reading in primary education.

So, with government policies to provide internet access for every children and every school, with industry supporting diverse digital education initiatives, and with families gaining internet access at home, much rides on the claim that digital technologies will be as important in the twenty-first century as was the book in the nineteenth.However, accompanying every step of these policy developments, critics have doubted that more or better ICT means more and better education. Some are anti-technology, harking back to an ideal of 'innocent childhood'.

Enhancing traditional learning outcomes

Educational policy regarding ICT hardware and software in schools has not primarily aimed to teach children how to use technologies, valuable though such skills are (Hobbs, 2007). Rather, the ambition is that ICT use will improve educational outcomes across the curriculum, as revealed in exam grades and other standardized measures of assessment. Achieving this aim would indeed justify the considerable expenditure and transformation of infrastructure witnessed in classrooms in the past decade.

It seems that a simple increase in ICT provision does not guarantee enhanced educational performance. Cox and Marshall (2007, p.63) observed that 'the contribution of ICT to students' learning was very dependent upon the type of ICT resource and the subject in which it was being used' - a far from generic or transferable effect and one that contradicts the easy assumption that because children like using technology, this in and of itself gives them the confidence and motivation that enhances learning.

Focusing on the few studies that rigorously contrasted learning via an online versus face-to-face condition, the meta-analysis did find a positive benefit for online over face-to-face

instruction, though the effect was larger for blended learning (modes of instruction that combine online and face-to-face). However, generally the comparisons did not control for curriculum content, aspects of pedagogy or learning time, and 'studies in which analysts judged the curriculum and instruction to be identical or almost identical in online and face-to-face conditions had smaller effects than those studies where the two conditions varied' . Nor did including digital or interactive elements such as videos or online quizzes add to the amount that students learned. On the other hand, digital 'manipulations that trigger learning activity or learner reflection and self-monitoring of understanding are effective'.

However, most of these studies concerned adults (e.g. from medical training or higher education programs), and 'when learners' age groups are considered separately, the mean effect size is significantly positive for undergraduate and older learners but not forstudents', thus revealing little benefit for school pupils.However broadband access in classrooms results in significant improvement in pupils' performance in national tests taken at age 16. A different technology, interactive whiteboards, is associated with an improvement in pupils' performance in national tests in English (particularly for low-achieving pupils and for writing), mathematics and science.It would be overly pessimistic to conclude that ICT has no benefit for education, for some positive findings exist, especially as regards improvements in children's motivation to learn rather than their learning outcomes (Passey and Roberts, 2004).

Hurdles of ICT in education

One problem with the literature is conceptual and methodological - the conflation of diverse forms of educational technology under the umbrella term 'ICT'. This term can include one-to-many technologies (usually used by the teacher at the front of the classroom) and peer-to-peer technologies, professionally produced and user-generated contents. It may include technologies specific to the school (e.g. interactive whiteboards) or those used across formal/informal boundaries (e.g. edugames) and, last, it includes both stand alone and online, networked technologies. Thus it is difficult to distinguish which aspects of technologically-mediated learning, if any, are effective in any particular situation.

A second problem is policy-related and practical - the failure to recognize that, although getting technology into classrooms has been resource-intensive, this pales by comparison

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with the far greater demands of ensuring its effective use. Changing schools is, in short, a lengthy and demanding process, and as yet, much of the investment in hardware has yet to show a noticeable benefit in educational practices and outcomes.

After watching teachers struggle in classrooms with technology, Seiter (2008, p. 36) notes that 'the hours of trial-and-error that many digital skills require and the freedom to develop a deep understanding of software that includes programming are nearly impossible to practice in a public school computer lab.' Indeed, although one benefit of ICT is that it supposedly enables self-paced learning, it is precisely in uses of ICT to support independent study that Selwyn et al. (2008) find most variation in implementation across schools, suggesting that social and economic dimensions of classroom practice moderate educational benefits. Similarly, when examining the educational potential of mobile technologies, Attewell, Savill-Smith and Douch (2009) argue that while technologies can make learning more convenient, it requires considerable input of teacher training, preparation and production of appropriate materials for such learning also to become more effective.

A third problem is intriguing – not only schools must change but so too must the home. Visions of learning 'anywhere, anytime', schools without boundaries, peer-based learning, the home-school link and building 'whole school communities' all depend not only on state policy and provision regarding schools but also on individual decisions by parents to provide internet access for their children at home.

The fourth and last problem is more fundamental. Although ICT has been promoted as means of improving basic skills of reading, writing, maths and science, both enhancing exam results and reducing disadvantage in traditional assessment processes, critics have rejected the lack of imagination in this agenda. They see it as wedded to a twentieth, even a nineteenth century conception of drill-and-skill education, with scholastic aptitude testing as the only legitimate outcome measure (e.g. Smith & Curtin, 1998). The alternative proposition is that digital technologies can support a more flexible, learner-centered notion of education that facilitates the soft skills vital for the new demands of the twenty-first century global service and information economy. This conception of learning capitalizes on the evident enthusiasm with which children use digital technologies for exploration, creativity and fun when at home, encompassing not just ICT-mediated formal educational and information resources but also,

indeed especially, the use of instant messaging, online gaming and social networking to foster constructive learning practices, peer collaboration and learner motivation.

Broadening expectations – enhancing soft skills

If the failure to demonstrate clear benefits of ICT use in the classroom is due less to the limited potential of ICT than to the limited (instrumental, reductionist) expectations of educationalists, this would have far-reaching consequences for teacher training, classroom management and curriculum design.

In short, according to more radical approach than that reviewed thus far, the potential of technology is that it may liberate teachers and pupils from the rigid hierarchies which have locked them to their desks, curricula and assessment straight jacket, mobilizing multiple activities as mediators of learning – not only reading and writing but also creating, designing, performing, searching and playing. Such transformations, it is hypothesized, render the role of the learner more flexible, negotiable, precisely because knowledge itself is fluid, open to interpretation. Turkle (1995) interprets this as a profound shift from a culture of calculation, where 'the modernist computational aesthetic promised to explain and unpack, to reduce and clarify' to a culture of simulation based on tinkering and experimentation, 'getting the lay of the land rather than figuring out the hierarchy of underlying structure and rules'

However, in the major government-funded studies that seek to evaluate educational benefits of ICT in schools, it seems that this alternative vision has made little headway in reframing or challenging the measures by which educational benefit might be evaluated, with traditional test scores or exam grades remain the priority in terms of outcome measures .Nonetheless, some of the ideas behind this alternative model have been variously incorporated within educational settings, albeit often in terms of ad hoc initiatives rather than general classroom practices.

While there are many reasons to remain optimistic about new initiatives to transform the learning process, it must be acknowledged that, first, traditional exam results and, indeed, possession of the knowledge they are designed to test, continue to be crucial for pupils' future success (and failure). Second, if one turns the same critical gaze on these initiatives as on

traditional attempts to enhance test scores, just as there is a lack of convincing evidence that ICT supports traditional educational outcomes, so too is evidence scarce that ICT enable creative, alternative forms of learning. As the review by LeBaron& McDonough (2009) makes plain, evidence for ICT having benefits as part of an alternative pedagogy is scattered, based on multiple small studies rather than having been subject to substantial (national and/or longitudinal), independent evaluations as reviewed earlier for traditional learning outcomes. The problems of missing failed cases (small interventions that did not work and so go unreported), of unsystematic comparisons (not based on those who do versus do not receive an intervention) and of confounding factors (most obviously, the considerable teacher effort and enthusiasm that often accompany such interventions) cannot be ignored.

Conclusion

As for the evidence, it does seem that we are witnessing the reconfiguration of pre-existing learning activities and opportunities for the majority of children and young people. Where once children went to the library to get a book for their homework, now they also search online. Where once they asked for advice from a parent, now they also 'ask an expert'. Where once they painted with paint and paper, now they do so also with a paint program, posting their pictures online to share with others. By and large, they welcome this and relish their new-found expertise and status in the digital world. It also seems that we are witnessing some genuinely new learning opportunities, centering on possibilities of child-oriented digital creativity and on collaborative communication with those who share similarly specialist or niche forms of interest and expertise. At present, this is only evident among a minority of young people – for new opportunities, especially if they rely on out of school resources, generate new inequalities. Only publicly funded institutions – schools especially but also youth and community centers – can work to make this fairer. Yet it is the successful embedding of these and related opportunities within the formal structures of the school and the traditional curriculum, for the benefit of all children, that remains uncertain.

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